Who's afraid of the big bad wolf: a prospective paradigm to test Rachman's indirect pathways in children

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Abstract

Rachman's (1977) theory of fear acquisition suggests that fears and phobias can be acquired through three pathways: direct conditioning; vicarious learning and information/instruction. Although retrospective studies have provided some evidence for these pathways in the development of phobias during childhood (see King, Gullone, & Ollendick, 1998 for a review), these studies have relied on long-term past memories of adult phobics or their parents. The current study was aimed towards developing a paradigm in which the plausibility of Rachman's indirect pathways could be investigated prospectively. In experiment 1, children aged between 7-9 were presented with two types of information about novel stimuli (two monsters): video information and verbal information in the form of a story. Fear-related beliefs about the monsters changed significantly as a result of verbal information but not video information. Having established an operational paradigm, Experiment 2 looked at whether the source of verbal information had an effect on changes in fear-beliefs. Using the same paradigm, information about the monsters was provided by either a teacher, an adult stranger, a peer, or no information was given. Again, verbal information significantly changed fear-beliefs, but only when the information came from an adult. The role of information in the acquisition of fear and maintenance of avoidant behaviour is discussed with reference to modern conditioning theories of fear acquisition.

Keywords

Children; Fears; Anxiety Disorders

Introduction

The Developmental Pattern of Normative Fears

There is now considerable evidence that children experience general patterns of normative fear throughout their development (see Field & Davey, in press). For example, during infancy children tend to fear stimuli within their immediate environment such as loud noises, objects and separation from a caretaker, but as the child matures these fears begin to incorporate anticipatory events and abstract stimuli (Campbell, 1986); Bauer (1976) also reported that younger children (4–8 years old) typically fear ghosts and animals whilst older children (10–12 years) are more likely to fear self-injury. These normative fears often appear and disappear spontaneously, follow a predictable course, frequently have an obvious adaptive significance, and reflect the everyday experiences of the child. As such they are seen as part of a normal pattern of development. General fearfulness decreases as age increases and that this decrease continues at a fairly rapid rate until the beginning of adolescence at which point normative fears stabilise, leaving only pervasive fears and phobias (Gullone and King, 1997, Draper and James, 1985).

Research into normative fear typically employs the Fear Survey Schedule for Children (FSSC-R) — a questionnaire that asks children to indicate on a three-point scale (*none*, *some* and *a lot*) how much they fear specific situations and stimuli. Despite subtle differences arising from methodology (see Muris, Merckelbach and Collaris, 1997a) this body of research suggests that the prominent clusters of childhood fears that emerge from the FSSC—R bear an intuitive relation to adult phobias. Examples are animal phobia, height phobia ('falling from a high place'), water phobia ('not being able to breath'), necrophobia ('fear of danger and death') and social phobias ('fear of failure and criticism') — see Ollendick, Hagopian and King, 1997 for a review. Recent evidence also suggests that these normative fears reflect serious anxiety disorders in a substantial minority of children (Muris, Merckelbach, Mayer & Prins, 2000).

Summarising this wealth of research (e.g. Muris et al., 1997a; Muris, Merckelbach, Meesters and Van Lier, 1997b; Ollendick and King, 1991; Silverman and Nelles, 1989) it seems that normative fears develop in the following way: situations/environment (early childhood), animals and ghosts (4-8 years old), injury (pre-adolescence), and social situations/criticism (adolescence). Field and Davey (in press) amongst others have noted that this developmental pattern corresponds to the retrospectively reported age of onset of related adult phobias. For example, both height phobic (Menzies and Clarke, 1993a) and water phobic (Menzies and Clarke, 1993b) adults often report that they have 'always' had their fear; animal and blood-injection phobic

report mean ages of onset of 7 and 9 years respectively (Öst, 1987) and social phobias develop much later (e.g. claustrophobia has an average age of onset of 20 years: Öst, 1987). This suggests the possibility that there are ages of vulnerability for certain adult phobias. However, the covariation between the developmental pattern of normative fears and the onset ages of adult phobias does not mean that normative fears will necessarily develop into phobias; however, as Field and Davey (in press) point out, it provides a strong basis for assuming that the seeds of anxiety are sown in childhood. This raises the question of how normative fears might develop into clinical fears.

Models of Fear Acquisition and Methodological Issues

Early accounts of phobia acquisition focussed on conditioning-based explanations (see Field & Davey, in press). In short, a conditioned stimulus (CS) comes to evoke anxiety or fear (the conditioned response, CR) through its association with a traumatic outcome (the unconditioned stimulus, UCS). Although there is some evidence to support this simplistic model in children (e.g. Yule, Udwin and Murdoch, 1990; Dollinger, O'Donnell and Staley, 1984; Watson & Rayner, 1920) it has come under considerable criticism (see Rachman, 1977). The major advance on the original model was Rachman's (1977, 1991) observation that nontraumatic experiences also had a crucial role in the development of fear. In his model Rachman suggested that in addition to direct conditioning experiences both observational (vicarious) learning and information could lead to fear. Although Rachman believed

that clinical fears would be the likely result of direct conditioning experiences, less intense fears could still emerge from vicarious learning episodes and exposure to negative information (the indirect pathways). The possible role of negative information and observational learning in the acquisition of fear is now widely accepted as vital when considering the role of conditioning in fear acquisition (Dadds, Davey & Field, in press), and have been incorporated into contemporary models of fear acquisition such as the conditioning model described by Field and Davey (in press), and Muris and Merckelbach's (in press) multifactorial model.

Evidence for Rachman's 3 pathways has been extensively reviewed (see King, Gullone & Ollendick, 1998; and Merckelbach, De Jong, Muris & Van den Hout, 1996). These reviews have concluded that there is support both for the three pathways and for the notion that direct conditioning is predominantly implicated in clinical phobias whereas indirect pathways more frequently contribute to mild fears (see Muris & Merckelbach, in press). However, there are several methodological issues arising from the literature. (1) *Retrospective accounts*: the main problem with this evidence is that it is all based on retrospective accounts in which patients are asked to assign their learning experiences to one of the three pathways some 10-20 years after the onset of their phobia. These reports will be prone to memory bias and forgetting of potentially important learning episodes (especially in the case of the indirect pathways). Although Brewin, Andrews & Gotlib (1993) have argued that retrospective reports can be accurate, they accept the evidence that autobiographical

memories can be stronger when they are unique, unexpected, have important consequences, or provoke an emotion (see Linton, 1979; Rubin & Kozin, 1984; and White, 1982). It, therefore, seems likely that direct, traumatic, conditioning experiences will be better remembered than the arguably less unique, less consequential, less unexpected and less emotion-evoking indirect experiences. One vast improvement in this methodology has been to corroborate patient evidence with retrospective parental reports (e.g. Merckelbach, Muris & Schouten, 1996; Muris, Steerneman, Merckelbach & Meesters, 1996). Nevertheless, many studies still rely on questionnaires such as the *Phobic Origin Questionnaire* (Öst & Hugdahl, 1981), which has been criticised for failing to identify essential components of the conditioning process resulting in misattributions of the cause of phobia (see Menzies and Clarke, 1994). There has been greater success in demonstrating the plausibility of vicarious learning prospectively using laboratory-bred rhesus monkeys (Mineka, Davidson, Cook, & Weir, 1984) but at present this learning appears to be selective and occur only for fear-relevant stimuli (Cook & Mineka, 1989). (2) *Forced choice*: these retrospective studies are also typically based on the *a priori* assumption that the pathways actually exist in that patients are forced to classify learning episodes as belonging to one of the three pathways. As such, these studies do not test whether a particular pathway is effective in changing fear, but merely to which pathway(s) patients will attribute their fear when forced. (3) *Control groups*: as King et al. (1998) point out, non-fearful control groups against which to compare the distribution of

learning episodes are seldom used. As such, evidence to date provides only equivocal support for the existence of indirect pathways to fear. To test the plausibility of the indirect pathways it is necessary to develop prospective techniques in which information (verbal or observed) is manipulated to assess its effect on fear. In doing so, the role of information in fear acquisition can be understood more unequivocally.

The main aim of this study was to develop a prospective paradigm in which to investigate the role of information in the exacerbation of normative fear in children. Fear beliefs about two novel stimuli were assessed before exposure to either positive or negative information or a video tape of an actor expressing fear or happiness towards the stimuli. Subsequent fear beliefs were measured to ascertain whether the information had changed fear beliefs. Based on Rachman's model, negative information should enhance fear beliefs regardless of the mode of presentation. Positive information should reduce fear beliefs or leave them unchanged. A second experiment explored whether the source of positive or negative information impacts on the change in fear beliefs.

EXPERIMENT 1

Method

Subjects

Subjects were 40 children (20 boys and 20 girls) recruited from primary schools in Surrey, UK. All experimental groups were matched for male to female ratio. The age range of the sample was 7 to 9 years old (M = 7.87, SD = 0.648). This age group was chosen on the basis that it is an important age for the development of animal phobias (Öst, 1987; Field and Davey, in press). Parental consent was obtained before the study: no parents refused to allow their child to participate. Children were tested in groups.

Materials

Two 'monster' dolls were used that were identical in every respect except colour: one was pink and one was yellow. These dolls were not representative of an actual creature (e.g. a cat or a dog) and were not widely available at the time of the experiment: as such they represented a creature about which the children had no prior experience. For the purposes of the experiment, the two dolls were given names: Takis (pink) and Makis (yellow). These names are proper first names in the Greek language but have no significant meaning in English and so children would

not associate them with any known creatures. Children were asked to imagine that the dolls represented real-life full-sized monsters.

Four video clips of approximately 30 seconds each were constructed. An adult female, aged 50, was filmed interacting with each doll on a couch. This 'mother' figure was filmed four times: twice with each doll. For each doll, the 'mother' was filmed once displaying enjoyment and active interaction with the doll and once displaying a fear expression and avoiding interaction with the doll. Therefore, for each doll there was a positive video and a negative video. Each school provided a TV set and video player on which these clips were played.

Two stories were constructed with the help of the schoolteachers that portrayed information about the monsters. Both stories described the doll as a real creature but one contained positive information about the monster whereas the other provided negative information. The name of the monster in the story could be changed to fit the experimental condition. Both stories can be found in Appendix A.

Finally, two questionnaires were used: The Fear Survey Schedule for Children — Revised (FSSCR: Yule, 1997) and a fear-belief questionnaire constructed to measure beliefs about the monsters in the experiment. The fear-belief questionnaire consisted of 18 items and asked children to rate their attitude towards the two dolls by circling a number from -2 (very sad) to +2 (very happy). Pictorial faces (happy and sad) were also included on the scale to help the children understand what was expected of them. For example, item number 3 stated "How do you feel about being friends with

Takis ?". Eight items referred to Makis, 8 to Takis and the remaining 2 were of a general nature, measuring attitudes towards monsters. The full questionnaire can be found in Appendix B.

Design

A 2 (Pathway: vicarious vs. information) x 2 (counterbalancing order: Makis positive information vs. Takis positive information) x 2 (Monster: Makis vs. Takis) x 2 (Time: beliefs before experiment vs. beliefs after experiment) mixed design was used with repeated measures on the last two variables. Having established that the counterbalancing order and the colour of the monster did not influence the results, the design was collapsed to a 2 (Pathway: vicarious vs. information) x 2 (infotype: positive vs. negative) x 2 (Time: beliefs before experiment vs. beliefs after experiment) mixed design with repeated measures on the last two variables. FSSC-R scores were used as a covariate to control for individual differences in normative fear.

Procedure

Children were divided randomly into four groups of ten: (a) *Video Makis+*: received positive video information for Makis and negative video information for Takis; (b) *Video Makis–*: acted as a counterbalance and received negative video information for Makis and positive video information for Takis; (c) Story *Makis+*: received positive story information for Makis and negative story information for

Takis; and (d) *Story Makis–*: again acted as a counterbalance and received negative story information for Makis and positive story information for Takis.

The first step was to administer the FSSC—R: Children were told to write their names on the first page, to read the written instructions and to wait for the experimenter to tell them to begin. Once all of the children were ready, the experimenter read out the first item of the FSSC—R and the possible answers that the child could give. Children then answered the first item and were told to proceed in the same manner for the remaining items. They were also told that if they didn't understand a question they should raise their hand and the experimenters would help them. This occurred only for item 28 of the FSSC—R because some children did not understand the meaning of the word 'unexpectedly'.

After all FSSC—R questionnaires were completed, children were introduced to the two monsters: Makis and Takis. The monsters were shown to all children briefly and they were asked to imagine that they were real full-size monsters. The two dolls were then placed at a high spot so everyone could see them. Next, the fear-belief questionnaire was administered (see Appendix). Children were told that the questionnaire was about the two creatures they had just met and that it asked questions about how happy they would be about certain situations involving the monsters. Again, children were told to raise their hands if they had any trouble in completing the questionnaire.

The next phase differed across the two main groups: Video vs. Story. In the video condition (*N = 20)* information was provided about the two monsters using the pre-recorded reactions of a mother figure to the two dolls. Half received positive information about Makis and negative information about Takis and the remainder received negative information about Makis and positive information about Takis. In the story condition (*N* = 20) half heard the positive story about Makis and the negative story about Takis while for the remainder the opposite was true. The children's head teacher read both stories.

Finally, all children were given the fear-belief questionnaire for a second time.

Results

Each item on the fear-belief questionnaire was reverse scored from 5 (very sad) to 1 (very happy) such that a high score corresponded to a high level of fear beliefs. The mean fear score for each monster was then calculated using the 8 items relating to that creature. Initially a four-way 2 (Pathway: vicarious vs. information) x 2 (counterbalancing order: Makis positive information vs. Takis positive information) x 2 (Monster: Makis vs. Takis) x 2 (Time: beliefs before experiment vs. beliefs after experiment) mixed ANCOVA was conducted with repeated measures on the last two variables. This analysis revealed no significant effects involving the counterbalancing order [all *F*s < 1]. Therefore, the final analysis was collapsed to a 2 (pathway: vicarious vs. information) x 2 (infotype: positive vs. negative) x 2 (time: beliefs before

experiment vs. beliefs after experiment) mixed ANCOVA with repeated measures on the last two variables and FSSC—R scores as a covariate.

Figure 1 illustrates the mean fear belief responses across conditions. Before the experiment, mean fear-belief scores were all around 2 (video-positive M = 1.80; video-negative M = 2.00; story-positive M = 2.11; story-negative M = 2.01). However, after the information was given, fear beliefs increased when negative information was presented (video M = 2.47; story M = 3.85) and decreased slightly when positive information was given (video M = 1.77, story M = 1.69).

Insert Figure 1 About Here

The analysis showed that there was a significant interaction between the type of information children received (whether positive or negative) and the pathway (video or story) used [F (1, 37) = 5.24, $p < 0.05$] and a significant pathway × time interaction [F (1, 37) = 4.38, $p < 0.05$]. More important, there was a significant infotype × time interaction [F (1, 37) = 6.22, $p < 0.05$]. This result indicates that the type of information given to the child significantly affected their beliefs about the monsters: children had a lower fear belief score for the creature associated with positive information at time 2 compared to time 1, but had a higher fear belief score for the creature associated with negative information at time 2 compared to time 1.

Finally, there was a significant 3-way pathway × infotype × time interaction [F (1, 37) = 12.35, $p < 0.01$] indicating that the effect of the different information over time

was stronger for one of the pathways compared to the other. Further analysis on this interaction revealed that the type of information had a significant effect in changing beliefs over time for the stories [F (1, 18) = 13.93, $p < 0.05$] but not for the videos [$F < 1$]. These finding indicate that information can significantly changed children's beliefs about novel stimuli but the observational learning material did not produce such a change.

FSSC—R scores were included as a covariate to establish that individual differences in normative fear did not affect the results. Indeed, there was no significant effect of FSSC—R scores [F(1, 37) = 1.72, NS] and this covariate did not interact with any of the repeated measures variables [all $Fs < 1$].

Discussion

The main finding of this first experiment was that different types of information about novel stimuli were effective in changing fear beliefs about those stimuli. Specifically, (a) positive information had little effect on fear beliefs (fairly neutral fear beliefs were slightly lowered); and (b) negative information had a substantial effect in increasing fear beliefs. In addition, direct verbal information was more successful than observational learning in this study. However, this study did not set out to compare the two indirect pathways because each pathway requires different information which may, or may not, be comparable in the strength and depth of information it portrays. The reason for the significant difference between the

vicarious (video) and information (story) conditions in this experiment may simply be because the videos were ineffective in portraying the appropriate information, or, that the strength of information that they portrayed was weaker than that of the stories.

The major implication of these findings is that the paradigm was a successful means by which to look at the role of verbal information on fear beliefs. This is important because it means that this paradigm can be adapted to test different aspects of the effects of negative information. In theoretical terms, the findings support much of the evidence from retrospective studies such as Ollendick and King (1991) who found that 88.8% of children attribute their fear to negative information and Doogan and Thomas (1992) who reported that negative information and instructions from parents was the most dominant pathway in the formation of a dog phobia. It also supports Davey's (1993) finding that different information can produce different beliefs about a novel real-life animal (although Davey did not look at changes in beliefs). However, this paradigm has made three important advances. First, although retrospective studies show that adults will attribute fear to negative information on a *post hoc* basis, these studies have not shown that this attribution is an accurate or plausible explanation of fear acquisition. This experiment has taken the first step to show that information is a plausible mechanism by which fear beliefs in children can be changed: even in a prospective study, unbiased by issues of the accuracy of long-term memory, negative information significantly changed fear

beliefs. This finding is a major step in demonstrating the effect of information on the beliefs children hold about objects of which they have no prior experience. Second, the retrospective studies have been criticised for not collecting data about the experiences of normal samples. The current paradigm can be used to investigate normal samples and Experiment 1 looked at children who, based on their FSSC—R scores, did not report anxiety-related problems (a so-called 'normal' group). Therefore, this experiment demonstrated that information can change fear beliefs in a normal sample implying that negative information is a plausible mechanism by which non-fearful children acquire fear beliefs about a novel stimulus. Third, the paradigm utilised a novel stimulus that ruled out a specific 'prepared' mechanism for acquiring fear. As such, Experiment 1 showed that information can change fear beliefs towards a stimulus that has no evolutionary significance (the child could not be pre-disposed to fear the creature because it isn't real).

However, the video information was not successful in changing fear beliefs, which suggests either that this paradigm is not a useful way to investigate this pathway, or that observational learning is not a viable pathway to fear. The latter explanation seems less likely given the evidence from monkeys (e.g. Mineka et al., 1994). Nevertheless, even primate studies suggest that fear-relevance of the stimulus is an important condition necessary for learning (Cook & Mineka, 1989). The present paradigm utilised a novel stimulus (which, by definition, should be fear-irrelevant), which could explain the lack of success in changing fear beliefs. Alternatively, the

videos produced may have been ineffective in portraying the appropriate information and future research needs to address these issues.

Although these advances made by prospective methodology are important there are limitations to what can be inferred from these data. Two issues in particular are considered here. First, the current paradigm did not provide a baseline against which to compare changes in beliefs when no information was provided. Second, the issue of the importance of the person from whom the information is received was not explored. In the present study, the children's head teacher read the stories. It isn't clear whether the information would have had such a strong effect had it come from a less well-respected, loved and authoritative person. The aim of experiment two was to use the prospective paradigm to investigate the effect of the source of information and to see whether fear beliefs change when no information is provided.

EXPERIMENT 2

Although Rachman (1977) made no predictions about whether the source of information was an important moderator for the information pathway it is undeniably possible that the source of information might be as important as the information itself. Muris et al. (1996), for example, found that trait anxiety in children was positively associated with trait anxiety of both the mother and father and that children of mothers who tended to express their fears often had the highest FSSC scores. However, fearfulness of the child was related only to the fearfulness of

the mother: the father's fear did not seem to contribute. In addition, a child's response to potentially threatening stimuli can be influenced through social referencing to a caregiver (Klinnert, Campos, Sorce, Emde, & Sredja, 1983). In Experiment 1, a teacher provided the information: a person in a care-giving role.

If information from mothers and caregivers can be an important factor in childhood fears then other sources might be important too. There is good evidence that children learn well from their peers. Over the past two decades educators have tried to identify successful methods to better educational development in children. Methods such as classwide peer tutoring and Peer Assisted Learning Schemes (PALS), in which higher performing students are paired with a lower performing peer, have proved an efficacious way of learning (e.g. Cooke, Heron & Heward, 1983; Greenwood, Delquadri, & Hall, 1989). PALS, for example, have been shown to improve the reading abilities of low to average achieving children, as well as children with diagnosed learning difficulties, when they are used in elementary-level mainstream settings (Fuchs, Fuchs, Mathes and Simmons, 1997; Fuchs, Fuchs, Kazdan & Allen 1999). This suggests that children are particularly able to learn important information from a peer. However, there is some degree of uncertainty about the conditions necessary for successful peer learning. It appears that at younger ages a person of greater competence is necessary for the successful transmission of information whereas at older ages an equal or even less competent person will suffice (Schaffer, 1992). For this reason Experiment 2 incorporated both

an equal (same age) peer and an older person (an adult stranger who was not in a care-giving role).

The first aim of this study was to replicate the finding of Experiment 1: to see whether fear beliefs about a novel stimulus could be influenced by negative information. In addition, this experiment sought to see whether the source of information had any influence over what is learned. Four sources were investigated: teacher (to replicate Experiment 1), peer, adult stranger and no information. Although it was predicted that the teacher should be most successful in changing beliefs (because of their caregiver role), predictions about the relative success of an adult stranger or a peer could not be made because of inconsistent past research.

Method

Subjects

Subjects were 45 schoolchildren aged 7-9 years (M = 7.94, SD = 0.742): 19 girls and 26 boys. Parental consent was obtained before the study: no parents refused to allow their child to participate.

Materials

All materials were the same as for Experiment 1: the FSSC—R, the fear belief questionnaire, the two dolls, and a positive and negative story.

Design

The design was similar to Experiment 1 except that only the stories were used (there were no conditions involving video presentations). However, the source of the information was varied across four different groups: teacher reading the stories (N = 12), an adult stranger (N = 10), a peer (N = 12), and a no-information control (N = 11).

Procedure

The procedure was ostensibly the same as for Experiment 1. The children were assigned to one of the four groups and given the FSSC—R to complete just as in Experiment 1. Once they had completed the FSSC—R, the children were introduced to the two dolls, Makis and Takis, and given the fear belief questionnaire to complete. In all groups except the no information control, children were told both the positive and negative story: one with Makis as the main character and the other with Takis. Although Experiment 1 revealed that the results were in no way influenced by the type of information associated with a particular monster, the monsters were counterbalanced across stories so that half of each group associated Makis with negative information and half associated Takis with negative information. The storyteller varied across three different groups of subjects. One group received the stories from their teacher, a second group heard the stories from a peer (a child volunteer from the group), and a final group heard the story from an adult stranger (the experimenter). In all cases the storyteller was female. In the no information

control children were allowed to carry on with their usual school activities for the time it would have taken to tell the stories.

After the stories had been read all the children were given the fear belief questionnaire to complete for a second time.

Results

As in experiment 1, each item on the fear-belief questionnaire was reverse scored from 5 (very sad) to 1 (very happy) such that a high score corresponded to a high level of fear beliefs. The mean fear score for each monster was then calculated using the 8 items relating to that creature. For the purpose of data analysis, the children in the group who received no information were randomly assigned to 'imaginary' conditions in which either Makis or Takis would have been associated with the negative information. Obviously, in reality no information was presented and so children could not associate either monster with a particular type of information. Initial analysis again revealed no significant effect of counterbalancing, therefore, the final analysis was a 3-way 4 (source: teacher, peer, stranger or no information) x 2 (infotype: positive vs. negative) x 2 (time: beliefs before experiment vs. beliefs after experiment) mixed ANCOVA with repeated measures on the last two variables and FSSC—R scores as a covariate.

Figure 2 illustrates the mean fear belief responses across conditions. As in experiment 1, mean fear-belief scores before the experiment were all low (teacher: positive M = 1.94, negative M = 2.45; peer: positive M = 2.16, negative M = 2.03;

stranger: positive M = 1.642, negative M = 1.41; no information: positive M = 2.22, negative M = 1.89). However, after the information was given, fear beliefs increased when negative information was presented (teacher M = 3.53; peer M = 2.73, stranger M = 4.08, no information M = 2.41) and decreased slightly when positive information was given (teacher M = 1.81; peer M = 2.02, stranger M = 1.49, no information M = 2.14).

Insert Figure 2 About Here

The three-way ANCOVA revealed that FSSC-R scores had no relationship with fear beliefs overall [$F < 1$] and did not interact with any of the repeated measures variables [all Fs < 1]. Therefore, children's normative fear level had no effect on fear beliefs. The analysis revealed a significant infotype × source interaction [$F(3, 40) = 5.655$, $p < 0.05$] indicating that the source of information interacted with the type of information to produce different fear beliefs. The time × source interaction was also significant [$F(3, 40) = 4.405$, $p < 0.05$], indicating that fear beliefs changed differently according to the source of information.

More important the infotype × time interaction was significant [$F(1, 40) = 6.780$, $p < 0.05$] indicating that the change in fear beliefs was dependent on the type of information. Figure 2 illustrates that in all conditions negative information increased fear beliefs whereas positive information led to a decrease or no change. Finally, the 3-way source × infotype × time interaction was significant [$F(3, 40) = 3.19$, $p < 0.05$] indicating that the change in fear beliefs resulting from different information was

stronger for some sources of information than for others. Figure 2 shows that the effect of the negative information was stronger when the information came from a teacher or stranger compared to both the peer and the control.

To tease apart the three-way interaction a hierarchical regression was carried out on the difference between ratings to the positive and negative toys. The difference between ratings at time 1 and time 2 and FSSC—R scores entered in the first block and 3 dummy variables were created representing orthogonal contrast codes (see Field, 2000) were entered in a second block. The first dummy coding variable compared the control group against the experimental groups (peer, stranger and teacher groups). This contrast was significant [$t(39) = -2.81$, $p < 0.05$] showing that the responses of the control group were significantly different from the other three groups. The second dummy coding variable compared the peer group against the stranger and teacher groups and was also significant [$t(39) = -2.77$, $p < 0.05$] indicating that the responses of the children in the peer group were significantly different from the other two experimental groups. Figure 2 shows that the peer had less effect than either the teacher or the stranger. The final dummy coding variable compared the stranger with the teacher group and was not significant [$t(39) = 1.19$, $p > 0.05$] showing that the pattern of change in fear beliefs was the same when both a teacher and stranger provided the information.

Discussion

The results from Experiment 2 support the main finding from Experiment 1: different types of information about novel stimuli were effective in changing fear beliefs about those stimuli. Like Experiment 1, negative information from a teacher was effective in significantly increasing fear beliefs. More important, this study suggested that the change in beliefs was significantly greater than when no information was presented. In addition, Experiment 2 showed that comparable changes in fear beliefs were observed when an adult stranger presented the information but not when a same-age peer was used.

The latter finding that same-age peers were not as successful in changing fear beliefs could be due to several reasons. For one thing, the fact that an adult stranger was successful in changing beliefs is consistent with French's (1984) observation that children between 6-9 years old prefer an older child rather than an age-mate when looking for guidance. There is also a peak at around 7-8 years in terms of the frequency of interaction with peers more than two years older compared to the frequency of interaction with same-age peers (Ellis, Rogoff, & Cromer, 1981). This evidence suggests that within the age range studied, children are particularly prone to interact with and perhaps learn from older people. The successful effect of the teacher also supports evidence from the literature on PAL, in which teachers are usually used to supplement learning experiences (e.g. Fuchs et al., 1999). Fuch et al. also found evidence that although PALS were beneficial to both primary and

intermediate schoolchildren, there was an increasing capacity with age to provide elaborated help to peers (because of the children's increasing developmental verbal facility). The unexpected failure of the same-age peer in this experiment could reflect a similar inferiority in the same-age peers to read the story as expressively as the adults.

In summary, this Experiment supports the idea that the source of information is important in changing fear beliefs about a novel stimulus. Specifically same-age peers seemed less successful in changing fear beliefs compared to a teacher and adult stranger.

General Discussion

Theoretical Implications

These experiments have shown how fear-beliefs about previously un-encountered creatures can be changed by verbal information. Therefore, information is a viable pathway by which fear beliefs can be modified. Specifically, negative information from an adult seems to enhance fear beliefs significantly compared to no information or a same-age peer.

In theoretical terms this finding supports a number of theorists. Most obviously it supports Rachman's (1977, 1991) original assertion that information should be enough to promote fear. However, there are limitations to the inferences that can be

drawn from the current study. For one thing, the fact that negative information can change fear beliefs does not tell us whether these beliefs are enough to evoke a fearful response or avoidant behaviour (although fear beliefs underlie phobic responding in clinical groups). To understand whether fear beliefs could produce physiological fear or avoidant behaviour it is necessary to look at psychological models of predicting behaviour from beliefs. One such model is the theory of reasoned action in which behaviour is predicted from attitudes towards the behaviour, subjective norms regarding that behaviour, and a sense of behavioural control (Ajzen & Fishbein, 1980; Ajzen & Madden, 1986). Based on this well-established theory, avoidant behaviour might be seen to derive from beliefs that this behaviour will prevent an unpleasant outcome and that individuals and groups important to the person perceive avoidance as an acceptable response to the situation. In addition, if a person sees few conflicting outcomes of the behaviour then this will increase the likelihood of the behaviour through a sense of perceived behavioural control (Ajzen & Madden, 1986).

The concepts in Azjen and Fishbein's model are consistent with some of the modern mechanisms implicated in recent conditioning models (e.g. Davey, 1997). For example, there is evidence from what is known about UCS-expectancy biases in conditioning that beliefs might facilitate physiological anxiety (see Davey, 1995 for a review). It is clear from this literature that prior expectancies about the probable outcome of a conditioning episode can assist the learning of CS-UCS contingencies.

Field and Davey (in press) have implicated verbally transmitted information in the creation of such expectancies in children. Once an expectancy about the likely outcome of interacting with a potential threat (a CS) is created, then a subsequent direct conditioning experience involving that stimulus and a negative outcome (UCS) is more likely to produce a fear response that is resistant to extinction (Davey, 1992a). Therefore, the causal pathway through which negative information is effective might be that it changes fear beliefs about a stimulus, which creates an expectancy about the probable outcome of an interaction with that stimulus, which in turn facilitates learning should a subsequent interaction with that stimulus be followed by a negative outcome. The present study provides the first support that information can create such expectancies about the probable outcome of an interaction with an un-encountered stimulus. The UCS-expectancy literature then provides the next link, which is that these expectancies will facilitate learning in a subsequent fear-related conditioning episode.

Therefore, one role of negative information is in creating expectancies about the probable outcome of a future interaction with an un-encountered stimulus. A second possible role of information is in creating beliefs that avoidant behaviour will have a desirable outcome. If a person expects an interaction with a stimulus to produce a negative outcome, then by avoiding that stimulus the person also avoids the negative outcome that is expected to occur. Therefore, the expectancies created about a stimulus by negative information give rise to positive beliefs about avoiding that

stimulus. The source of the information that created the expectancies might be particularly relevant in this context too: if the source is important to the individual in some way then a subjective norm about avoidance might also be created. One such norm would be "if interaction with the stimulus has negative consequences then it is best avoided". Based on Ajzen and Fishbien's model avoidant behaviour would be more likely if people significant to the child in some way endorsed this norm. As the present study has shown, the importance of a source is a complex issue, but the data support past research suggesting that caregivers are important. Experiment 2 also suggests that for this age group an older peer/young adult might also suffice because of the propensity to interact with older peers at this developmental stage. Finally, avoidance seems intuitively to bring with it the perception of behavioural control because avoiding is likely to produce a more positive outcome than not avoiding (although this intuition requires empirical validation). Therefore, information from a relevant source creates expectancies about the probable outcome of interacting with a stimulus. It, therefore, creates expectancies about the desirable outcome associated with avoiding that stimulus. In doing so, subjective norms about interaction/avoidance are created that are both endorsed by a significant person and bring with them behavioural control. The theory of reasoned action would predict that avoidance is likely. As such, information may be a catalyst to maintaining fear by promoting avoidance.

Although expectancies can facilitate learning and possibly promote avoidance, a final consideration is whether fear beliefs themselves can lead to physiological fear in the absence of direct conditioning experiences. Recent evidence suggests that fear beliefs might be transformed into physiological fear through processes such as cognitive rehearsal (or rumination) and catastrophizing. Field and Davey (in press) have suggested that cognitive rehearsal may enhance anxiety through catastrophizing and there is now considerable evidence that: (1) rehearsing the consequences of fear-related encounter can maintain anxiety levels (Jones and Davey, 1990; Davey and Matchett, 1994); (2) rehearsing the consequences of an interaction can increase anxiety (Field, 1999) and facilitate negative catastrophizing (Field, 1999; Sullivan, Bishop & Pivik, 1995); and (3) catastrophizing can lead to increasing levels of subjective discomfort in those prone to worry (Vasey & Borkovec, 1993). Therefore, it is possible that negative information could lead to mild fears in the following way. Information creates beliefs about the likely outcome of an interaction with a stimulus. These negative consequences are rehearsed and then catastrophized (which might depend on personality factors) leading to subjective discomfort. This possibility is an area of ongoing research.

Limitations and future work

This study investigated the role of information about a novel stimulus. However, verbal information has also been implicated in revaluing the outcome of a prior learning episode (Davey, 1989, 1992b). UCS revaluation typically refers to a situation

in which the severity of the outcome of a learning episode is inflated due to subsequent experience or information. The inflation of the perceived severity of the outcome of a learning episode can result in fear being acquired subsequent to the learning episode. For example, Davey, de Jong and Tallis (1993) cite the case of a girl who awoke to find a large tropical spider on her face. Although not initially scared, information provided by her parents the following morning made her re-assesses the potential severity of the encounter resulting in severe anxiety towards spiders. Therefore, information subsequent to a learning episode may contribute to acquiring severe levels of fear. The current study lends support to the idea that negative information creates fear beliefs. However, beliefs about interacting with the CS (and not about an outcome, or UCS, that had actually been experienced) were measured. Future work is needed to (a) look directly at whether information about the outcome of a prior learning episode can change beliefs in the same way, (b) investigate the generalization of acquired fear beliefs, and (c) examine the persistence of acquired fear beliefs.

This study looked at the acquisition of fear beliefs in 7-8 year olds because this is an important developmental period for simple phobias. Field and Davey (in press) amongst others have suggested that there may be developmental periods in which certain fears/anxieties may be prone to develop and hence the success of information in changing fear beliefs in the present study may be because of the relevance of the information to the developmental period. Future work might look to compare other

age groups for which the development of simple phobias is not so relevant. In doing so, it will be possible to see whether it is necessary for the content of negative information to be congruent with the pattern of development of normative fears.

Finally, the current paradigm although useful as a starting point for prospective research, is limited by the consistency of information, which can be affected by who presents it, and how it is presented. Future studies should aim to incorporate some measures (as is done in PALS) to see whether the strength and content of information is consistent across conditions. This would be particularly useful in allowing tentative comparisons about the strength of the vicarious pathway compared to verbal information, and in checking the consistency of verbal information from different sources.

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Appendix

Appendix A: Stories

Positive story

Once upon a time, there lived a friendly caring monster called _____. He lived in a lovely little cottage with a garden full of flowers. Little children loved to visit _____ because he would play with them and read them stories and give them candy. One beautiful sunny day _____ went for a walk in a filed of daffodils. As _____ was walking he heard someone crying. He saw a little girl sitting underneath a tree. _____ asked her why she was crying and she told him that she had lost her favourite necklace. _____ hated to see anyone so sad so he promised that he would find her necklace. They searched all over the field, again and again, until they thought they would never find it. Suddenly, _____ tripped over a rock and saw the little girl's necklace hidden under a log. _____ gave the necklace back to the little girl. She was so happy, she gave him a giant hug and thanked him. They went back to _____'s cottage and celebrated eating jam and donuts. All the children told _____ he was the most wonderful friend in the whole world. _____ was very happy because he always liked to help children.

Negative story

Once upon a time, there lived a horrible scary monster called _____. _____ was 12ft tall with huge sharp fangs for eating children with. He was so ugly that

anyone who had ever seen him ran away as fast as he could. He lived in a deep dark forest where everyone was afraid to go, in a big black castle. Every full moon _____ became really hungry and would go down to the nearby village in the middle of the night to steal a sleeping child. All the villagers were really scared of _____ and would lock their children up safely, every night. However, evil _____ could always find his way in. _____ would take the sleeping child back to his big dark castle and lock him in the dungeons until he was ready to eat him. _____ made a huge fire in the kitchen and hung a large pot over it. The villagers could see the smoke rising out of the dark forest and waited in terror for what they knew was about to happen. _____ the horrible monster would not be hungry again until the next full moon.

Appendix B: Fear-Belief Questions

How do you feel about monsters?

How do you feel about monsters when you go to bed?

How do you feel about being friends with Takis?

Would you be happy to play with Takis?

Do you think Makis would hurt you?

How scared would you be if Makis was hiding under your bed?

How would you feel if Takis fell over and hurt himself?

How scared would you be if Makis was chasing you?

Do you think Takis would hurt you?

Would you be happy to play with Makis?

How scared would you be if Takis was hiding under your bed?

How would your friends feel about playing with Makis?

How do you feel about being friends with Makis?

Would you be happy to stay alone with Makis?

How would your friends feel about playing with Takis?

Would you be happy to stay alone with Takis?

How scared would you be if Takis was chasing you?

How would you feel if Makis fell over and hurt himself?

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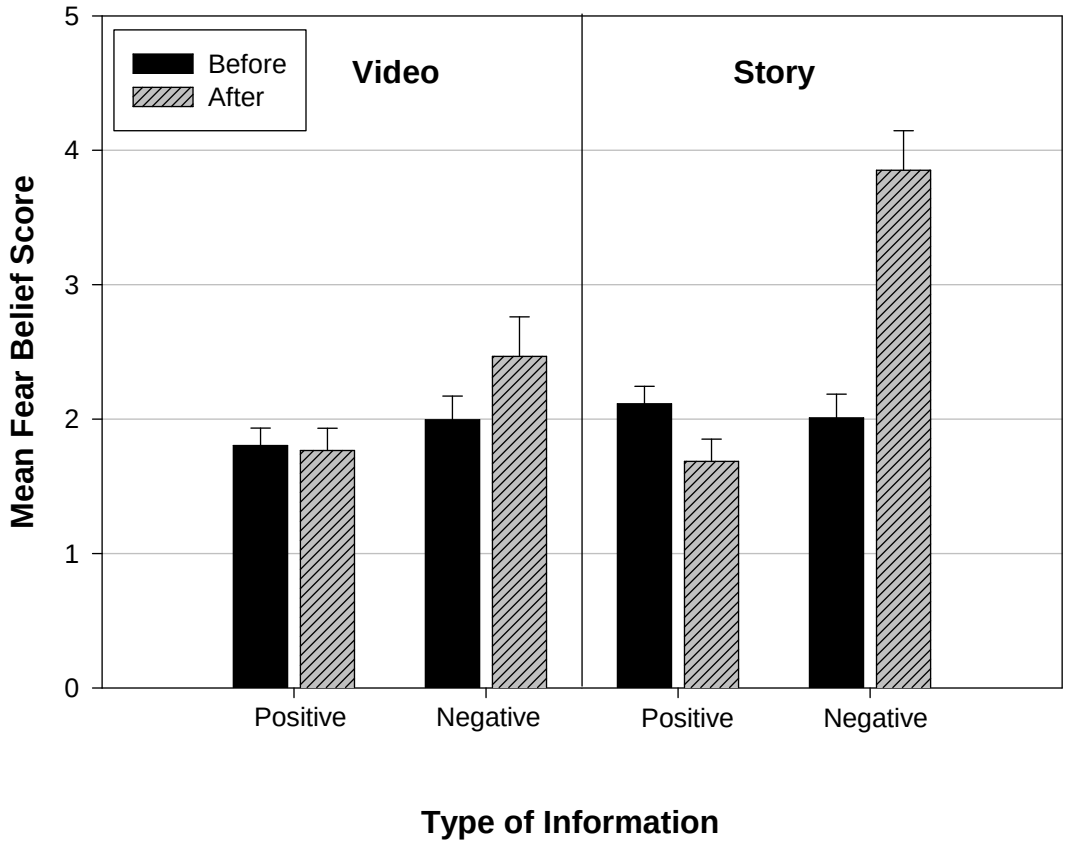
Figures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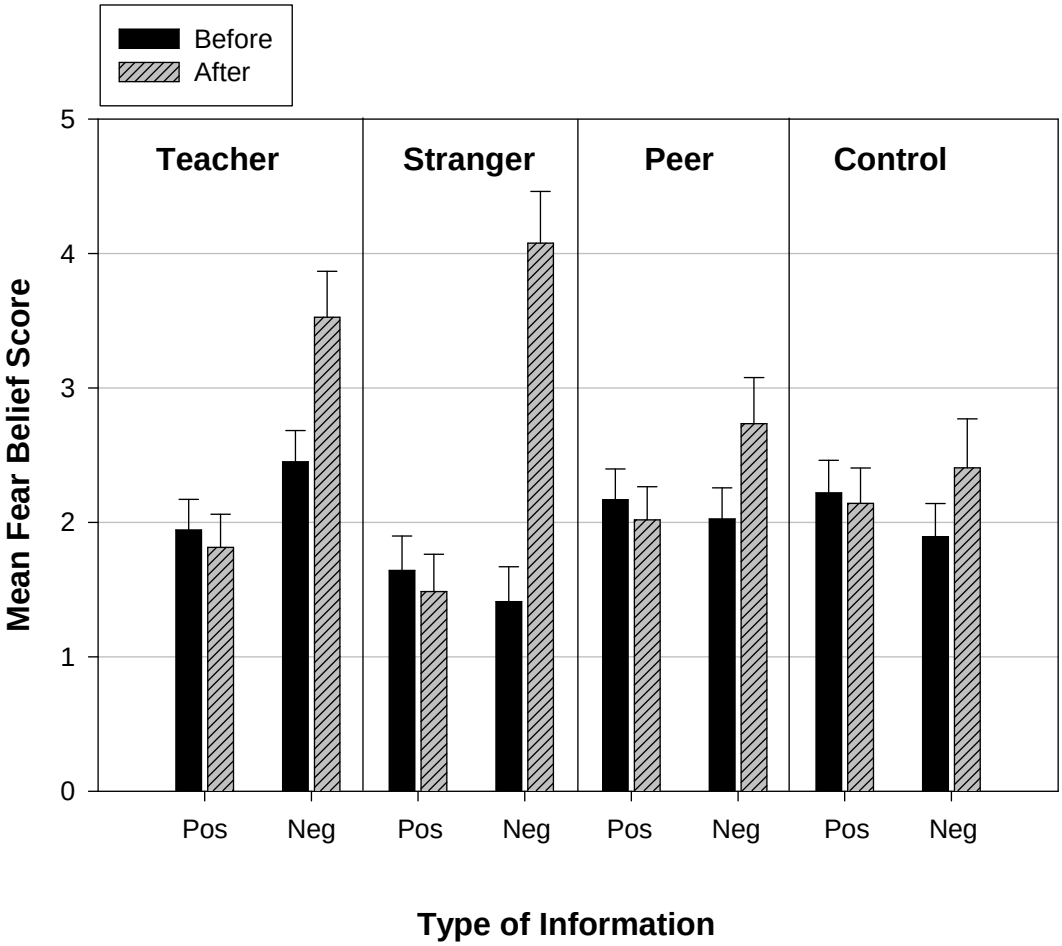
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